CLAIM AMENDMENTS

Amend claims: 1-18 and add new claims 19-42.

1. (Currently Amended) A process for the preparation of hydrocarbons and the generation of heat by reaction of carbon monoxide and hydrogen in the presence of a catalyst at elevated temperature and pressure in at least two stages, the process comprising:

i) introducing a gas comprising carbon monoxide and hydrogen into a first reactor section comprising catalyst and introducing cooling ~~fluidum~~ fluid into this first reactor section;

ii) allowing a part of the carbon monoxide and hydrogen to react catalytically in the first reactor section to hydrocarbons and water, at least part of the reaction heat being absorbed directly by the cooling ~~fluidum~~ fluid;

iii) withdrawing from the reactor section a ~~stream consisting of the~~ reaction product stream comprising the hydrocarbons, water, unconverted feed and cooling ~~fluidum~~ fluid;

iv) cooling down at least part of the withdrawn stream comprising cooling to ~~fluidum~~ fluid generate heat;

v) optionally removing water from the withdrawn stream;

vi) introducing stream obtained in step v) comprising at least unconverted carbon monoxide and hydrogen into a second or further reactor section comprising catalyst and introducing cooling ~~fluidum~~ fluid into this second or further reactor section;

vii) optionally introducing a hydrogen containing stream into the second or further reactor section;

viii) allowing a part of the carbon monoxide and hydrogen to react catalytically in the second or further reactor section to hydrocarbons and water, at least part of the reaction heat being absorbed directly by the cooling ~~fluidum~~ fluid;

ix) optionally repeating steps iii–viii in further reactor sections; and,

x) withdrawing from the last reactor section the reaction product comprising the hydrocarbons, water, any unconverted carbon monoxide, any unconverted hydrogen and cooling ~~fluidum~~ fluid.

2. (Currently Amended) ~~A~~ The process ~~according to~~ of claim 1, in which the number of stages is between 5 and 20~~, preferably between 8 and 12~~.

3. (Currently Amended) ~~A~~ The process ~~according to~~ of claim 1 ~~or 2~~, in which the CO conversion per stage is between 3 and 40 vol%~~, preferably between 6 and 15 vol% (conversion of CO based on feed stream to the first reactor section)~~.

4. (Currently Amended) ~~A~~ The process ~~according to any~~ of claim 1 ~~to 3~~, in which the H_2/CO ratio of the gas feed to the first stage is between 1.6 and 0.4~~, preferably between 1.1 and 0.5, especially a process in which additional hydrogen is introduced in the one or more stages following the first stage, preferably in such a way that the H_2/CO ratio to the second and further stages is between 1.6 and 0.4, more preferably between 1.1 and 0.5~~.

5. (Currently Amended) ~~A~~ The process ~~according to any~~ of claims 1 ~~to~~ 4, in which in the first reactor section, ~~preferably all reactor sections,~~ at least 50% of the heat generated by the reaction is directly absorbed by the cooling ~~fluidum~~ fluid~~, preferably at least 90%~~.

6. (Currently Amended) The process ~~according to~~ of claim 5, in which ~~at least~~ the first reactor section is an adiabatic reactor section~~, preferably all reactor sections are adiabatic reactor sections~~.

7. (Currently Amended) The process ~~according to~~ of claims 1 ~~to 6~~, in which the temperature increase of the cooling fluid per reactor section is between 5 °C and 20 °C~~, preferably between 7 and 15 °C~~.

8. (Currently Amended) The process ~~according to any~~ of claims 1 ~~to 7~~, in which GHSV of the carbon monoxide and hydrogen together is between 2000 and 20000 Nl/l/h~~, preferably between 3000 and 10000 Nl/l/h~~ based on total catalyst volume ~~(including voids)~~.

9. (Currently Amended) The process ~~according to any~~ of claims 1 ~~to 8~~, in which the volume ratio ~~(STP)~~ between the gas fraction and the cooling ~~fluidum~~ fluid fraction introduced in each reactor section is between 0.5 and 2~~, preferably about 1~~.

10. (Currently Amended) The process ~~according to any~~ of claims 1 ~~to 9~~, in which the catalyst comprises iron, cobalt or nickel on a carrier~~, especially cobalt, preferably in combination with one or more promoters selected from manganese and zirconium oxide or rhenium and platinum~~.

11. (Currently Amended) The process ~~according to~~ of claim 10, in which the catalyst comprises a carrier in the form of a fixed bed~~, preferably a fixed bed having a void ratio between 50 and 85 vol%, preferably between 60 and 80 vol%~~.

12. (Currently Amended) The process ~~according to~~ of claim 11, in which the fixed bed comprises one or more monolithic structures~~, preferably ceramic monolithic structures, metal extruded monolithes or carbon monolithes, layers of corrugated plates, especially metal corrugated plates, gauzes, especially metal gauzes or shavings, especially metal shavings~~.

13. (Currently Amended) The process ~~according to any~~ of claims 1 ~~to 12~~, in which heat is exchanged to decrease the temperature of the stream withdrawn from any reactor section by 5–20 °C~~, preferably 7–15 °C, more preferably by the temperature increase of the reactor section involved~~.

14. (Currently Amended) The process ~~according to any~~ of claims 1 ~~to 13~~, in which the cooled down stream withdrawn from one or more reactor sections~~, preferably each second reactor sections,~~ is separated into a liquid stream and a gaseous stream, followed by further cooling down the gaseous stream, ~~suitably~~ to a temperature between 80 and 150 °C~~, preferably to a temperature between 90 and 130 °C~~.

15. (Currently Amended) The process ~~according to any~~ of claims 1 ~~to 14~~, in which water is removed from the process by separating water from the withdrawn stream from the reactor sections~~, preferably by separating water from the cooled down withdrawn streams or from the cooled down gas streams following condensation of water after cooling down or by membrane separation from the withdrawn streams~~.

16. (Currently Amended) The process ~~according to any~~ of claims 1 ~~to 23~~, in which cooled down cooling ~~fluidum~~ fluid from a reactor section is introduced into the same reactor section or in which cooled down cooling ~~fluidum~~ fluid from a reactor section is introduced into the next reactor section.

17. (Currently Amended) The process ~~according to any~~ of claim 1, ~~the preceding claims~~, in which the temperature of the hydrocarbon synthesis reaction is between 170 and 320 °C~~, preferably between 190 and 270 °C,~~ and the pressure is between 5 and 150 bar~~, preferably between 20 and 80 bar~~.

18. (Currently Amended) ~~Reactor~~ A reactor suitable for carrying out ~~the~~ a process ~~as described in any of the preceding claims.~~ for the preparation of hydrocarbons and the generation of heat by reaction of carbon monoxide and hydrogen in the presence of a catalyst at elevated temperature and pressure in at least two stages, the process comprising:

i) introducing a gas comprising carbon monoxide and hydrogen into a first reactor section comprising catalyst and introducing cooling fluid into this first reactor section;

ii) allowing a part of the carbon monoxide and hydrogen to react catalytically in the first reactor section to hydrocarbons and water, at least part of the reaction heat being absorbed directly by the cooling fluid;

iii) withdrawing from the reactor section a reaction product stream comprising the hydrocarbons, water, unconverted feed and cooling fluid;

iv) cooling down at least part of the withdrawn stream comprising cooling fluid to generate heat;

v) optionally removing water from the withdrawn stream;

vi) introducing stream obtained in step v) comprising at least unconverted carbon monoxide and hydrogen into a second or further reactor section comprising catalyst and introducing cooling fluid into this second or further reactor section;

vii) optionally introducing a hydrogen containing stream into the second or further reactor section;

viii) allowing a part of the carbon monoxide and hydrogen to react catalytically in the second or further reactor section to hydrocarbons and water, at least part of the reaction heat being absorbed directly by the cooling fluid;

ix) optionally repeating steps iii–viii in further reactor sections; and,

x) withdrawing from the last reactor section the reaction product comprising the hydrocarbons, water, any unconverted carbon monoxide, any unconverted hydrogen and cooling fluid.

19. (New) The process of claim 1, in which the number of stages is between 8 and 12.

20. (New) The process of claim 1, in which the CO conversion per stage is between 6 and 15 vol%.

21. (New) The process of claim 1, in which the H_2/CO ratio of the gas feed to the first stage is between 0.5 and 1.1.

22. (New) The process of claim 1, in which additional hydrogen is introduced in the one or more stages following the first stage.

23. (New) The process of claim 22, in which the H_2/CO ratio in the second and further stages is between 0.4 and 1.6.

24. (New) The process of claim 22, in which the H_2/CO ratio in the second and further stages is between 0.5 and 1.1.

25. (New) The process of claim 1, in which in all reactor sections at least 50% of the heat generated by the reaction is directly absorbed by the cooling fluid.

26. (New) The process of claim 1, in which at least 90% of the heat generated by the reaction is directly absorbed by the cooling fluid.

27. (New) The process of claim 1, in which all reactor sections are adiabatic reactor sections.

28. (New) The process of claim 1, in which the temperature increase of the cooling fluid per reactor section is between 70°C and 15°C.

29. (New) The process of claim 1, in which GHSV of the carbon monoxide and hydrogen together is between 3000 and 10,000 Nl/l/h based on total catalyst volume.

30. (New) The process of claim 1, in which the catalyst comprises cobalt on a carrier.

31. (New) The process of claim 30, in which the catalyst further comprises one or more promoters selected from manganese and zirconium oxide or rhenium and platinum.

32. (New) The process of claim 30, in which the catalyst comprises a carrier in the form of a fixed bed.

33. (New) The process of claim 32, in which the fixed bed has a void ratio between 50 vol% and 85 vol%.

34. (New) The process of claim 32, in which the fixed bed has a void ratio between 60 vol% and 80 vol%.

35. (New) The process of claim 32, in which the fixed bed comprises a carrier in the form of a fixed bed.

36. (New) The process of claim 10, in which the catalyst further comprises one or more promoters selected from manganese and zirconium oxide or rhenium and platinum.

37. (New) The process of claim 11, in which the fixed bed has a void ratio between 50 vol% and 85 vol%.

38. (New) The process of claim 11, in which the fixed bed has a void ratio between 60 vol% and 80 vol%.

39. (New) The process of claim 12, in which the monolithic structures are selected from the group consisting of ceramic monolithic structures, metal extruded monoliths, carbon monoliths, layers of corrugated plates, gauzes and shavings.

40. (New) The process of claim 1, in which heat is exchanged to decrease the temperature of the stream withdrawn from any reactor section by 7°C to 15°C.

41. (New) The process of claim 1, in which heat is exchanged to decrease the temperature of the stream withdrawn from any reactor section by the temperature increase of the reactor section involved.

42. (New) The process of claim 1, in which the temperature of the hydrocarbon synthesis reaction is between 190°C and 270°C and the pressure is between 20 bar and 80 bar.